QUALITY ASSURANCE PROJECT PLAN FOR A SPECIAL STUDY OF PCB SOURCE ASSESSMENT IN THE JAMES RIVER RICHMOND, VA TO WINDMILL POINT, VA 2002

Commonwealth of Virginia

Departmental of Environmental Quality

Piedmont Regional Office

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Table 1 Document Approvals

TITLE	NAME	DATE	APPROVAL
Office Director / Regional Director	Gerry Seeley, Jr.		
Project Manager	Mark S. Alling		
VADEQ Water Quality Monitoring Quality Assurance Officer	Tzong Yeu Du (Gary)		
Laboratory Quality Assurance Officer	Dr. Robert Hale		
Data User	Jennifer Palmore		

TABLE OF CONTENTS

TABLE OF TABLES

Table 2 Distribution List

TITLE	NAME
Office Director / Regional Director	Gerry Seeley, Jr.
Project Manager	Mark S. Alling
VADEQ Water Quality Monitoring Quality Assurance Officer	Tzong Yeu Du (Gary)
Laboratory Quality Assurance Officer	Dr. Robert Hale
Field Team Coordinator	Louis Seivard
Data Users	Jennifer Palmore

1. PROJECT MANAGEMENT

1.1. Project/Task Organization

1.1.1. Management Responsibilities:

1.1.1.1. Office Director / Regional Director

The office or regional director is responsible for the final approval of the QAPP, including all associated monitoring costs.

1.1.1.2. Project Manager:

The project manager is responsible for task implementation, technical quality control and performing or overseeing data evaluation activities. The project manager is responsible for ensuring the QA/QC procedures described in this QA project plan are followed

1.1.1.3. Quality Assurance Officer:

The QA Officer works independently of the project manager and will report to the project manager quarterly by memo on the adequacy, status, and effectiveness of QA program.

Conducts audits of field activities and laboratory activities.

Validates laboratory data.

Ensures that corrective action, if necessary, is properly implemented and documented.

1.1.1.4. Field Team Coordinator:

The field team coordinator is responsible for monitoring and directing the field team activities. The field team coordinator will ensure that field technical staff are properly trained and equipped to execute the field sampling methods and procedures as well as the sampling, handling and custody procedures.

1.1.1.5. Laboratory Quality Assurance Officer:

Conducts audits of laboratory activities.

Validates laboratory data before final certification.

Ensures that corrective action is properly implemented and documented.

1.1.1.6. Field Staff

The field staff are responsible for all field activities including preparation and calibration of equipment, preparation and organization of sampling equipment and containers, collection of samples, packaging and preparation for transportation to the contract lab and any other assignments as needed.

1.2. **Problem Definition/Background**

Carp and Blue Catfish tissues collected in 2001 exceeded the VDH level of concern of 600 ppb or higher for PCBs, a specific toxic contaminant. Carp samples from Bailey Creek at Rt. 10 in Hopewell, VA, had PCB levels of 699 ppb, from the James River near I-95 in Richmond, VA, had 937 ppb, and from the James River at Buoy 104 below Hopewell, VA, had 809 ppb. Blue Catfish samples from Bailey Creek at Rt. 10 had PCB levels of 778 ppb, from the James River near I-95 had 1197 ppb, and from the James River at Buoy 104 had 3212 ppb. Also, the VDH requested a follow up study to determine the magnitude and extent of fish contamination.

The above 2001 carp and blue catfish tissues analyzed using EPA risk assessment techniques for PCBs as carcinogens exceeded the EPA risk-based Screening Value (SV) of 54 ppb. Although PCBs are only suspected carcinogens, the carp tissues also exceeded the SV for non-carcinogens of 220 ppb. The SV threshold is from Table 6a of the Water Quality Assessment Guidance Manual for Y2002 305(b) Water Quality Report and 303(d) Impaired Waters List (DEQ, draft September 5, 2001).

As a result of the above tissue analyses, the VDH recommended no eating of blue catfish, and only two meals per month of carp in the area of the James River from the I-95 bridge in Richmond, VA downstream to Windmill Point below Hopewell, VA. This suggests a potential threat to human health upon which the Director may determine the need for a source assessment.

This same segment was listed impaired for fish consumption use in the draft 2002 303(d) Impaired waters list (Segment ID VAP-G01E-03) due to PCBs in tissues of multiple species at James River miles 98.64, 86.22, 74.44, and 66.88, Bailey Creek at Rt. 10, and in the tidal Appomattox River at miles 1.53 and 4.12 collected in 1997.

Therefore this project is consistent with the DEQ Toxic Contamination Source Assessment Policy (TCSAP, Jan. 5, 2000) which describes when and how to conduct source assessments for toxic contaminants. The circumstances above represent triggers listed in that document, which indicates the need for source assessment.

1.3. Project / Task Description

1.3.1. Project Manager

Task 1. The Project Manager Develops the QAPP. The QA project plan should describe the whole project in detail.

Task 2. Seeks written approval of the QAPP from each of the individuals listed in Table 1 Document Approvals on page 2.

Task 3. Requests from the lab liaison any new parameter group codes as needed. Establish stations in CEDSWQM, determines sample collection logistics including coordination with the SWI or others involved in data collection and analysis. Sets up the yearly schedule and monthly run schedule in CEDSWQM.

1.3.2. Field Team Coordinator

Task 4. Collects field data. Detailed sampling procedures are presented in section 3.2.2 Sampling Preparation and Procedures on page 18.

1.3.3. Laboratory Technicians

Task 5. Laboratory analysis of water samples. The laboratory method and laboratory requirements are described in 3.4.1 Analytical Method Requirements on page 19.

1.3.4. Laboratory Quality Assurance Officer

Task 6. Data validation. The laboratory analytical results are validated to assess for bias completeness, representativeness, and acceptable levels of precision and accuracy.

1.3.5. VADEQ Water Quality Monitoring Quality Assurance Officer

Task 7. Auditing. Field and laboratory activities will be audited throughout the project. These technical systems audits are further described in 2.3.3 Audit Reports on page 13.

1.3.6. Project Manager

Task 8. The project manager will write the final report of findings of this study.

1.3.7. Work Schedule

August 2002 – Draft QAPP

September 2002 – Concurrence signatures on final draft QAPP.

October – December 2002 – First Tier of sediment sampling at known PCB sites, and screening tests of sediments/soils at tributaries, PS outfalls. Submit sediment samples to vendor for analysis. Analysis and reporting of sample results from vendor typically take six to eight months.

October 2002 – June 2003 – Concurrent literature search, interviews of industrial and municipal site staff, review of historical data to compile list of possible source locations for second tier of sampling.

June – December 2003 – Assess results of first tier of sampling. Second tier of sediment sampling at possible sources identified in historical search, and at hotspots identified by first tier of sampling. Submit samples to vendor.

June – December 2004 – Assess results of second tier of sampling. Third tier of sediment and soils sampling at hotspots identified by second tier of sampling. Submit samples to vendor.

June – December 2005 – Assess results of third tier of sampling. Fourth tier of soils sampling at hotspots identified by third tier of sampling. Submit samples to vendor.

Spring 2006 – Final report due two months after return of last tier of sample results.

Summer 2006 and beyond – Remediation of hotspots as indicated by findings.

2. Costs of Implementation:

Table 3 shows Estimated Project Costs. The Virginia Legislature has amended the Virginia Environmental Emergency Response Fund (VEERF) to stipulate that VEERF can be used for conducting the assessments described here in accordance with DEQ's TCSA Policy (VEERF Policy Statement 2-2001, effective 9/11/2000).

Total Cost for First Tier sampling Oct 2002 – June 2003 only: **$ 60135**

Mileage Vehicle ($ 392)**:** Includes round trip mileage for Piedmont Office field team travel to a mid point on the James River study segment (86 mi), at the Jordan Point Yacht haven, Rt. 156, Hopewell, VA. Boat ($219): Includes round trip mileage from Jordan Point Yacht haven (mid point in river segment) (24 mi), at a per mile rate of twice the vehicle rate because boat gas mileage is approximately one half of vehicle gas mileage.

Chemical Analysis ($ 29050): This covers laboratory analysis, monitoring equipment, and expendable supplies for sediment samples analyzed by VIMS, and screening tests **for the first tier only**. Most of the funds are for laboratory analysis work. Sediment analysis will be through VIMS. ASTM Method 8082 for congeners will be used. The analytical costs for sediment averages $520 each

constituting the largest fraction of the budget. Hach PCB in Soil Screening tests are estimated to average $30 per sample ($1000 up front equipment costs plus $20 per sample for test kits). We project that 49 sediment and 119 screening test samples will be collected and analyzed for the first tier. The sediment collection equipment is partially expendable and partially reusable after proper cleaning with special solutions. The expendable category includes personal protective equipment and supplies (PPE) used at the target sites.

Salary ($26274):

a) **Site inspections & sediment sample collection** ($0): The DEQ PRO regional staff will perform the collection of soils, individual sediments and tributary sediments. The manpower for and sediment and screening sampling is estimated at 60 FTE days for Oct – Dec 2002 (two staff for 6 preparation days and 24 filed sampling days).

b) **PCB Inspector** ($26274)**:** To accomplish the scope of work a WE-14 PCB Inspector position is necessary from October 2002 through June 2003. The majority of records investigation, accumulation, and assessment will occur within the boundaries of the Piedmont Regional Office (PRO), but some work will extend upstream to the Lynchburg area. While personnel in PRO and CO are expected to generate certain in-house information, extensive effort is needed to assemble, process, and track the information for DEQ management. and the Committee. Off-site searches for and copying of information at other agencies, organizations, and industries will be necessary. An on-site WE-14 that can assist in interviews and surveys, conduct record searches, assemble applicable information, and do the leg work for all units over nine months is an essential component that will move this project forward. The WE-14 will also participate in first tier field sampling.

Incidentals ($ 4200): A commitment of $3000 for map development, report production, and copying will be needed. Costs include publication of Citizen Advisory Committee meeting notices in local newspapers, and reference materials. A court reporter will take and prepare Advisory Committee meeting notes.

Any change in the scope of work to include special contracted services or expanded sampling will require additional resources. For example, effluent monitoring may enlarge or may require additional supplies specific to sampling for PCBs and may also require special analyses. The Tier 2 - 4 monitoring costs are uncertain and dependent on the number of target sites discovered.

Itemized Budget:

CATEGORY	COST
Mileage (Vehicle and boat**:**	
Vehicle ($0.19/mi) roundtrip to Jordan Pt ramp (24 trips X 86mi)	$392
Boat (($0.38/mi)(1/2 gas mileage of vehicle)) roundtrip to river mid pt.(24 trips X 24mi)	$219
subtotal:	$611
Sample Analysis: sediment ($520 ea), screening ($30 ea; $1000 up front, $20/ sample)	
First Tier Oct – Dec 2002	$29050
(n=49 sediment, 119 screening)	
Second Tier Sampling	$unk
Third Tier Sampling	$unk
Fourth Tier Sampling	$unk
subtotal: (n=51)	$29050
c. dischargers ($520 ea):	
Not done in First Tier	$0
Salary:	
WE-14 salary (9mo X 20d X 8 hr X $13.19/hr + $7.65% Fringe + 28.5% Indirects))	$26274
Incidentals:	
report publication, reference materials, safety gear	$3000
expendables for PCB sample collection	$1200
subtotal:	$4200
Total, Oct 2002 = June 2003	$60135

2.1. Quality Objectives and Criteria for Measurement Data

Data generated by this project will be of the highest quality as the outcome of the results may greatly impact the public. Field and laboratory personnel will use approved sample collection and analysis procedures as stipulated in 40 CFR 136 to ensure that accuracy, precision, representation, comparability, and completeness of the data generated achieve the high confidence level necessary.

2.2. Special Personnel Training Requirement

The sample collection and analysis of these samples requires no special training as the procedures are routine.

2.3. Documentation and Records

Documentation of field and laboratory data will be stored in the Comprehensive Environmental Data System Water Quality Module, CEDSWQM. In addition the QAPP and any final reports or conclusions will be stored in CEDSWQM.

Chain of Custody documentation will be required for this project because it measures sediment and soil conditions at point or nonpoint sources.

2.3.1. Field Documentation

Field Documentation is described on page 18. Examples of selected forms are included as appendices. All the data collected in the field will be entered into CEDSWQM.

In summary, the field team will be responsible for maintaining the following documents:

(1) Field Data Sheet

(2) Field Log Books

(3) Quality Control Checks for field equipment.

(4) Sample container labels

2.3.2. Laboratory Documentation

Laboratory documentation will include producing the following information:

(1) Electronic data transfer (as per CEDS documentation, reference) to VADEQ of final certified data,

(2) Printed copies of Certificates of analysis when specifically requested to do so,

(3) Any other data associated with the measurement process when specifically requested to do so.

2.3.3. Audit Reports

Technical system audits will be conducted as needed by the field team coordinator during field activities or by the VA-DEQ QA Officer during field and laboratory activities. The auditors will prepare a report summarizing the observations and findings of each of these audits. As needed, the audit reports will be supplemented by a corrective action plan, to be implemented as soon as feasible, to correct each observation or finding of erroneous procedures.

2.3.4. Data Validation Reports

Only valid and certified data will be transferred to the VADEQ from the laboratory. Data validation flags will be applied to those sample results that fall outside of specific limits.

Periodically the Laboratory Quality Assurance Officer, at the request of VADEQ, will identify biases inherent in the data including assessment of laboratory performance and overall precision, accuracy, representativeness and completeness. The data validation report will address whether the quality of the flagged data affects the ability to use the data as intended. As needed, the data validation reports will be supplemented by a corrective action plan, to be implemented as soon as feasible, to correct each observation or finding of erroneous procedures.

3. MEASUREMENT/ DATA ACQUISITION

3.1. Experimental Design

A literature search, interviews of industrial and municipal site staff, review of historical data will occur concurrently with tier one sampling. Literature searches will include RCRA and TOSCA , Superfund and DEQ PReP databases, VPDES DMRs, and DEQ special studies.

3.1.1. Projected Sites for Tier 1 VIMS samples and Screening Tests:

Site	VIMS sample	Screening Test
Bailey Cr, Fort Lee (Seamans Petroleum Sch)	2	2
Bremo Bluff Power Plant		1
James R, 3 DOC prisons		3
James R Bent Creek area (seds & fish prior PCBs)	1	1
Piney River titanium area		1
25 RR bridges beside James R to Lynchburg	5	25
old Haxall canal power station	1	1
Nelson Transformers (Southside)	2	2
Richmond STP outfall	1	1
Falling Creek STP outfall	1	1
Proctors Creek STP outfall	1	1
Shockoe Retention Basin outfall	1	1
SIMS Metals America fluff pile trib	2	2
Koch Oil Terminal	1	1
Intermediate Terminal		1
Deepwater Terminal		1
Dupont Spruance outfall	1	1
Dupont Bellwood Rd	1	1
Dominion Va Power plant (Farrar Gut and JMS outfalls)	3	3
Henrico STP outfall	1	1
Brown&Williamson Tobacco outfall	1	1

Dupont Teijin outfall	1	1
Phillip Morris outfall	1	1
Honeywell Chesterfield outfall	1	1
Federal Prison old outfall		1
Petersburg STP outfall and South Channel	2	2
Landfill, South Channel	1	1
Honeywell Hopewell outfalls(Poythress and 2 Gravelly)	3	3
Aqualon landfill & stormwater outfalls	6	6
Stone Container JMS & Gravelly Run	2	2
Hopewell RWTF outfall	1	1
James Tributary mouths:		
Reedy Creek		1
Powhite Creek		1
Tuckahoe Creek		1
Gillies Creek		1
Almond Creek		1
Goodes Creek		1
Kingsland Creek		1
Cornelius Creek		1
Manchester Canal		1
Proctors Creek		1
Four Mile Creek , Griggs Pond		2
Swift Creek		1
Falling Creek		1
Rohoic Creek		1

Lieutenants Run		1
Harrison Creek		1
Poor Creek		1
Old Town Creek		1
Turkey Island Creek		1
Johnson Creek		1
Herring Creek		1
Poythress Run	3	3
Gravelly Run		1
Bailey Creek	2	2
Powell Creek		1
Gunns Run		1
Queens Creek		1
Courthouse Creek		1
Flowerdew Creek		1
Wards Creek		1
Kittewan Creek		1
No Name Creek		1
Cattail Creek Petersburg		1
Canal Creek Hopewell		1
Mainstem stations interspersed where great distance between tribs		10

An unknown number of stations may be added pending literature and internal document search to occur concurrently with first tier sampling.

3.1.2. Citizen Advisory Committee on PCB Source Identification in the James River

A Citizen Advisory Committee will be formed composed of citizens who work or live in the affected area. The composition will represent public interests on the river. They will advise DEQ on the direction and substance of second and subsequent tier monitoring, the steps necessary to communicate information to the local public, and provide local information and perspectives critical to the project's success. First tier sampling will be performed proactively prior to the development of the Citizens Advisory Committee. Periodic meetings with the Citizen Advisory Committee and the public in the affected area will be conducted to update the public and the press on investigation progress and discoveries.

3.1.3. Additional Monitoring in Subsequent Tiers

Subsequent tier monitoring will depend on results from sediment samples and screening tests, as well as literature search findings. Future tier monitoring may include SPMDs (artificial fish) at select dischargers where sediment PCBs are found. SRU staff may collect fish tissues at select hot spot stations.

3.1.4. Safety Procedures

Activities covered under this study plan include 1) in-house investigations, 2) site and facility surveys, 3) general sampling, and 4) known PCB site sampling. These activities are listed in increasing degree of health and safety planning. 1) In-house investigations require the base-line health and safety actions applicable in the DEQ work place. 2) Site and facility surveys will generally require steel-toed boots, hard hat, and eye and hearing protection. This protective gear is the same as for VPDES or Pretreatment compliance inspections of industries and municipal STPs. Reduced protection is allowed in facility offices during interviews where the individual is not exposed to mechanical or physical hazards. 3) General sampling is defined as sample collection on sites without a history of PCB use or contamination, where there is a low probability of encountering PCBs. General sampling protection will include double gloves, disposable boots, and eye protection. 4) known PCB site sampling is sample collection on sites with a history of PCB use or contamination, and where there is a high probability of encountering PCBs (concentrations above 1 ppm). On these sites, Level D personal protection will be employed. Waste generated during sampling will be appropriately disposed of and sampling equipment cleaned prior to any reuse as described in the H&S Plan.

Medical monitoring of blood PCB levels prior to and following the study will be performed on staff taking samples.

3.2. Field Sampling Methods Requirements

This section describes the field procedures for collecting sediment samples[1].

3.2.1. Preparation for Field Work

Before field work begins, the field team coordinator will prepare a comprehensive check list of all necessary field equipment. This list is to be incorporated into this document and is to be used by the field staff to prepare for field activities.

3.2.2. Sampling Preparation and Procedures

3.2.2.1. Sampling Preparation

All sampling equipment preparation and cleaning procedures found in the Standard Operation Procedures (SOP) Manual for the Department of Environmental Quality (Office of Water Quality Assessment[1]) will be followed. All field calibration and testing procedures outlined in the SOP manual will be followed.

3.2.2.2. Sampling Procedures

All sediment sampling procedures found in the SOP manual will be followed. Composite sediment sampling will be preferred if sufficient mud and clay sediment are available at stations. The number of sub-samples composited will be dependent upon the area of mud – clay present per station, and will be recorded in field sheets. Sand sediments will be avoided if at all possible. PCB Screening tests in soils and sediment will be performed according to Hach Co. SOPs.

3.2.3. Sample Containers, Preservation, and Holding Times

The required sample containers, preservation and maximum holding times are specified by VIMS for sediment sampling and by Hach Co. for PCB in Soil screening tests.

Field Documentation

All necessary field documentation, including observations, measurements, and any other documentation pertaining to the survey will be kept by the field sampling team. Entries will be made in blue or black indelible ink. Corrections will consist of a single line-out deletion and/or correction that is initialed.

[1] Virginia Department of Environmental Quality, Ambient Water Quality Monitoring Standard Operating Procedures Manual.

3.2.4. Sample Numbering System

Standard DEQ sample identification procedures will be assigned to each sample collected. Each station ID, date, time, depth and collector will be used, as sample identification.

3.2.5. Field Forms

The field sampling team will be responsible for maintaining the field data sheet.

An entry will be made on the field data sheet for each sample collected. The intent of the field data sheet is to document the place, date, time, depth, and % from right bank of each sample is collected, any known deviation from the specified sampling described herein, and other pertinent field observations associated with the samples.

3.3. Field Corrective Action

Corrective actions will be initiated, at the direction of the DEQ QA Officer, if the field team is not adhering to the sampling or documentation SOPs, or if laboratory results indicate interference, systematic contamination, or problems with sample handling protocols.

3.4. Sample Handling and Custody

Sediment samples are preserved as described in Standard Operation Procedures (SOP) Manual for the Department of Environmental Quality. Samples will be delivered to VIMS by DEQ staff. Upon reaching the laboratory, samples will be handled in accordance with VIMS laboratory sample handling procedures. Screening test samples will be preserved according to Hach Co. requirements.

3.4.1. Analytical Method Requirements

All sample analyses will be conducted using either standard, approved analytical test methods or methods acceptable to VA DEQ. The analytical procedures and standard test methods used by the VIMS laboratory will be identified in the sample analysis contract with VIMS.

3.4.2. Quality Control Requirements

Identification of samples received by the VIMS lab must match identification on field sheets. Non-matching samples will be rejected.

3.4.3. Field Quality Control Samples

All field quality control samples will be collected in accordance with the DEQ WQM SOP[1]. Field splits will be collected at a frequency of 10%. These QA samples will be

collected independently of any other project or program. All QA samples will be delivered to VIMS using established QA protocols.

3.4.4. Laboratory Quality Control

All laboratory samples are analyzed in accordance with established standard laboratory methods, procedures and QA SOPs, to include evaluation of accuracy, precision, representativeness and comparability.

3.5. Instrument and Equipment Testing, Inspection, and Maintenance Requirements

The field team coordinator will be responsible for maintaining the equipment used to measure all the requested water quality field parameters, in accordance with the DEQ WQM SOP.

3.6. Inspection/Acceptance Requirements for Supplies and Consumables

The field team coordinator will be responsible for inspecting incoming equipment and supplies before placing them in service.

3.7. Data Management

Project data will include computer and handwritten entries. Field observations, measurements and records such as sample collection and shipping information will be recorded on hardcopy forms. The responsible laboratory personnel will enter data analyzed in the laboratory into VIMS data management files. Following validation and approval, VIMS data is shipped securely to DEQ.

4. OVERSIGHT AND ASSESSMENT

4.1. Technical System Audits (TSA)

The field team coordinator and/or the DEQ QA Officer will conduct TSA of field activities. The laboratory QA Officer and/or the DEQ QA Officer will perform TSA of laboratory operations.

Field TSA focus on availability and proper use of field equipment; adherence to project-controlling documents for sample collection, identification, handling, and transport; proper collection and handling of QC samples. Laboratory TSA includes reviews of sample handing procedures, internal sample tracking, SOPs, analytical data documentation, QA/QC protocols, and data reporting.

4.2. Audit Report

The responsible field team coordinator and/or QA Officer will prepare an audit report summarizing the observations and findings of the TSA. When necessary, the TSA report will include a corrective action plan to correct each observation or finding of erroneous procedures.

4.3. Data Validation Reports

A data validation report will be prepared for the laboratory data report. The data validation report will address whether the quality of the data is appropriate for the intended use of the data.

The DEQ QA Officer will issue the data validation report. The report will include QA/QC issues, findings, and deficiencies.

5. DATA VALIDATION AND USABILITY

5.1. Data Review, Validation, and Verification

Each of following areas will be reviewed:

(1) Sampling collection procedures

(2) Sample handling

(3) Analytical procedures

(4) Quality control verification of equipment blanks (EB) and field splits (S1 & S2).

5.2. Validation and Verification Methods

Data validation will be performed, reviewed and interpreted by DEQ QA Officer. The analytical laboratory report will be reviewed for compliance with the applicable method and for the quality of the data reported. The data validation procedures are designed to identify biases inherent in the data including assessment of laboratory performance, overall precision and accuracy, representativeness, and completeness. Data validation flags from the laboratory will be applied, in the form of Remark Codes, to those sample results that fall outside of the QC acceptance criteria.

Data Reduction, Analysis and Interpretation

Data reduction, analysis and interpretation will be performed by VIMS researchers.

5.3. REFERENCES

1997 EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5. Office of Research and Development. EPA/600/R-96/055

2001. EPA Requirements for Quality Assurance Project Plans. Office of Environmental Information. EPA QA/R-5. http://www.epa.gov/quality/qs-docs/r5-final.pdf.

2001. Standard Operation Procedures Manual for the Department of Environmental Quality. Office of Water Quality Assessment.